9th Class 2016		
Biology	Group-II	Paper-I
Time: 1.45 Hours	(Subjective Type)	Marks: 48

(Part-I)

Q.2. Write short answers to any Five (5) questions: (10)

(i) What is Biotechnology? Elaborate its usefulness.

Ans It is the latest profession in the field of biology. Biotechnologists study and work for the production of useful products through microorganisms.

(ii) What is role of Bu Ali Sena in Biology?

Ans Bu Ali Sena (980-1037 AD) is honoured as the founder of medicine and called as Avicenna in the West. He was a physician, philosopher, astronomer and poet. One of his books "Al-Qanun-fi al-Tib" is known as the canon of medicine in West.

(iii) Differentiate between theory and law.

Ans The hypotheses that stand the test of time (often tested and never rejected), are called theories. A theory is supported by a great deal of evidence. Productive theory keeps on suggesting new hypotheses and so testing goes on. Many biologists take it as a challenge and exert greater efforts to disprove the theory. If a theory survives such doubtful approach and continues to be supported by experimental evidence, it becomes a law or principle.

(iv) How hypothesis is framed?

Ans Observations do not become scientific observations until they are organized and related to a question. Biologist organizes his / her and others' observations into data form and constructs a statement that may prove to be the answer of the biological problem under study. This tentative explanation of observations is called a hypothesis.

(v) What are effects of human being on Biodiversity?

Ans To improve the living conditions for 600 million humans, we are imposing serious threats to the survival of biodiversity. Habitat loss, deforestation, over-hunting, introduction or removal of species, pollution and climate change are the major causes of species extinction.

(vi) Why viruses are not included in five kingdom system?

Ans Viruses contain either RNA or DNA, normally encased in protein coat. They reproduce only in living cells, where they cause a number of diseases. They are not considered as organisms and thus are not included in the five-kingdom classification system.

(vii) What is the basic difference in cell division of plants and animals?

Ans The bodies of animals and plants are made of different cell types. An animal cell becomes rounded before cell division and plant cells do not change shape before the division.

(viii) Plants do note make their gametes by meiosis. Why?

Ans Plants have an "alternation of generations." The gametes are produced by the "gametophyte generation". The gametophyte generation is haploid, so the cells that become the gametes are actually produced by mitosis not by meiosis.

Q.3. Write short answers to any Five (5) questions: (10)

(i) Differentiate between Endocytosis and Exocytosis.

Ans Endocytosis is a process of cellular ingestion of bulky materials by infolding of cell membranes. While in exocytosis, the bulky material is exported from the cell.

(ii) What is meant by hypertonic and hypotonic solution?

Ans A hypertonic solution has relatively more solute while a hypotonic solution has relatively less solute.

(iii) Write a note on centrioles.

Ans Animals and many unicellular organisms have hollow and cylindrical organelles known as centrioles. Each centriole is made of nine triplets of microtubules. Animal cells have two centrioles located near the exterior surface of nucleus. The two centerioles are collectively called a centrosome. Their function is to help in the formation of spindle fibers during cell division. In some cells, centrioles are involved in the formation of cilia and flagella.

(iv) What is meant by denaturing of enzymes?

Ans When temperature is raised well above the optimum temperature, heat energy increases the vibrations of atoms of enzyme and the globular structure of enzyme is lost. This is known as denaturing of enzymes.

(v) Write down uses of enzymes.

Ans **Uses of Enzymes:**

Enzymes are extensively used in different industries for fast chemical reactions. For example:

1. Food industry:

Enzymes that break starch into simple sugars are used in the production of white bread, buns, etc.

2. Brewing industry:

Enzymes break starch and proteins. The products are used by yeast for fermentation (to produce alcohol).

(vi) What is optimum temperature?

Ans Every enzyme works at its maximum rate at a specific temperature called as optimum temperature for that enzyme.

(vii) What is meant by photolysis?

Ans Light breaks water molecule and oxygen is released which is called photolysis. The hydrogen atoms of water give electrons to chlorophyll and become ions.

(viii) What is lactic acid fermentation?

Ans Lactic acid fermentation occurs in skeletal muscles of humans and other animals during extreme physical activities. This also happens in the bacteria present in milk. In this type of anaerobic respiration, each pyruvic acid molecule is converted into lactic acid ($C_2H_6O_3$).

Q.4. Write short answers to any Five (5) questions: (10)

(i) What is the function of vitamin C in body?

Ans The functions of vitamin C are; collagen formation, neaiing of wounds and functioning of immune system.

(ii) Write down the name of two diseases caused by minerals deficiency.

Ans Following are the two diseases caused by minerals deficiency:

1. Goiter
2. Anaemia

(iii) Write components of human food.

Ans Following are the components of human food:

1. Carbohydrates
2. Lipids
3. Nucleic acids
4. Proteins
5. Minerals
6. Vitamins
7. Water

(iv) Write the weight and size of liver in an adult human.

Ans In an adult human, liver weighs about 1.5 kg and is the size of a football.

(v) Define systole and diastole.

Ans In the human heart, when atria and ventricles relax and blood is filled in atria, the period is called cardiac diastole. Immediately after their filling, both atria contract and pump blood towards ventricles. This period in cardiac cycle is called atrial systole.

(vi) How much white blood cells are present in the body and what are their functions?

Ans One cubic millimeter of blood contains 7,000 to 8,000 white blood cells. The function of white blood cells is the main agent in body's defence system.

(vii) Write down names of two systems of transport of materials in human.

Ans Following are the two systems of transport of materials in human:

1. Arterial system
2. Venous system

(viii) Write the causes of dengue fever.

Ans In dengue fever, there is a sharp decrease in the number of platelets in blood. Because of this, patients bleed from the nose, gums and under the skin.

(Part-II)

Note: Attempt any Two (2) questions.

Q.5.(a) Biology is divided into different branches. Explain any four. (4)

Ans Biology is the scientific study of life. The word "biology" has been derived from two Greek words; 'bios' meaning 'life' and 'logos' meaning 'thought or reasoning'. In the course of biology, we will study how man has thought about living things. To understand and appreciate nature, it is essential to study the structures, functions and related aspects of living organism. The study of living organisms also provides information and remedies to human problems regarding health, food, environment, etc.

This division of biology deals with the study of microorganisms such as bacteria etc. In order to study all the aspects of life, these divisions are further divided into different branches as defined below:

1. Morphology:

This branch deals with the study of form and structures of living organisms.

2. Anatomy:

The study of internal structures is called anatomy.

3. Histology:

The microscopic study of tissues is called histology.

4. Cell biology:

The study of the structures and functions of cells and cell organelles is called cell biology. This branch also deals with the study of cell division.

(b) Differentiate between prokaryotic and eukaryotic cells. (5)

Ans

	Eukaryotic cell		Prokaryotic cell
1.	Membrane bounded prominent nucleus is present.	1.	Membrane bounded nucleus is absent.
2.	Ribosomes are large in size.	2.	Ribosomes are small in size.
3.	Cell wall is made of cellulose (in plants) and chitin (in fungi).	3.	Cell wall is made of peptidoglycan.

Q.6.(a) Describe the importance of mitosis. (4)

Ans **Development and growth:**

The number of cells within an organism increase by mitosis. This is the basis of the development of a multicellular body from a single cell *i.e.*, zygote and also the basis of the growth of multicellular body.

Cell replacement:

In some parts of body, *e.g.*, skin and digestive tract, cells are constantly sloughed off and replaced by new ones. New cells are formed by mitosis and so are exact copies of the cells being replaced. Similarly, red blood cells have short life-span (about 4 months) and new red blood cells are formed by mitosis.

Regeneration:

Some organisms can regenerate parts of their bodies. The production of new cells is achieved by mitosis. For example; sea star regenerates its lost arm through mitosis.

Asexual reproduction:

Some organisms produce genetically similar offspring through asexual reproduction. Mitosis is a mean of asexual reproduction. For example; hydra reproduces asexually by budding. The cells at the surface of hydra undergo mitosis and form a mass called bud. Mitosis continues in the cells of bud and it grows into a new individual. The same division happens during asexual reproduction (vegetative propagation) in plants.

(b) Describe the mechanism of respiration. (5)

Ans Mechanism of respiration:

The process of respiration includes complex series of reactions. It can be studied under the following headings.

(i) Glycolysis:

The breakdown of glucose molecule into two pyruvic acid molecules is called as glycolysis. It occurs in the cytoplasm of the cell and oxygen is not involved in this process. It occurs in aerobic as well as in anaerobic respiration.

(ii) Kreb's cycle:

It occurs in the mitochondria of the cell. In Kreb's cycle, the pyruvic acid molecules are completely oxidized along with the formation of ATP, NADH and $FADH_2$. Before entering into Kreb's cycle, the pyruvic acid is changed into acetyl CoA.

(iii) Electron transport chain (ETC):

It involves the transfer of electrons on electron transport chain. It is the last step of cellular respiration. In this step, NADH and $FADH_2$ release electrons and hydrogen ions. These electrons are picked up by a series of electron carriers. When the electrons move through a series of electron carriers, the energy is lost and used in the formation of ATP. At the end of the chain, the electrons and hydrogen ions combine with molecular oxygen and water is formed.

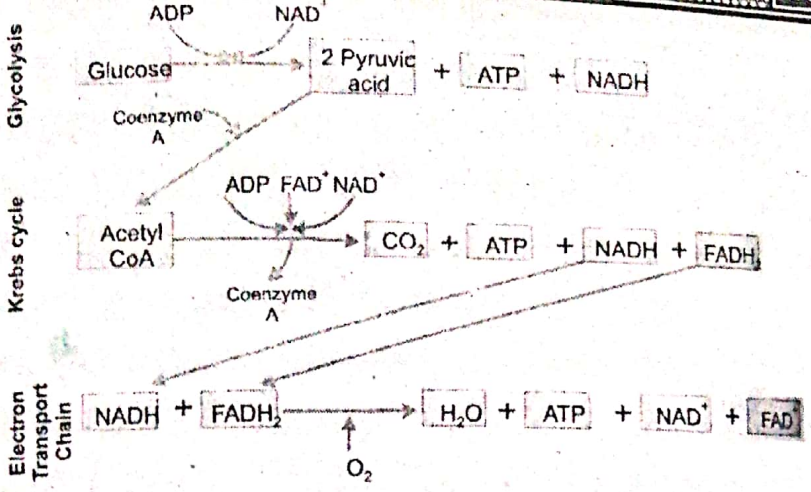

Fig. Mechanism of respiration.

Q.7.(a) Describe the importance of fertilizers. (4)

Ans **Importance of Fertilizers:**

As humans cultivated plants, it was learned that addition of certain materials to soil sometimes resulted in plants with desirable characteristics (*e.g.*, more fruit, faster growth, more attractive flowers). Such materials were named as fertilizers. Fertilizers are broadly classified as organic or inorganic.

Naturally occurring inorganic fertilizers include rock phosphate, elemental sulfur and gypsum. These are not chemically modified. If nitrogen is the main element, they are called nitrogen fertilizers. Most inorganic fertilizers dissolve readily in water and are immediately available to plants for uptake.

Organic fertilizers are derived from plant and animal materials. They are more complex and take time to be broken down into forms usable by plants. Manure and compost are used as organic fertilizers. They can also increase soil drainage, aeration and the ability of the soil to hold nutrients.

(b) Explain the opening and closing of stomata. (5)

Ans **Opening and Closing of Stomata:**

Most plants keep their stomata open during the day and close them at night. It is the responsibility of stomata to regulate transpiration via the actions of guard cells. The

two guard cells of a stoma are attached to each other at their ends. The inner concave sides of guard cells that enclose a stoma are thicker than the outer convex sides. When guard cells get water and become turgid, their shapes are like two beans and the stoma between them opens. When guard cells loose water and become flaccid, their inner sides touch each other and stoma closes. Light causes the movement of potassium ions from epidermal cells into guard cells. Water follows these ions and enters guard cells. Thus their turgidity increases and stoma opens. As the day progresses, guard cells make glucose *i.e.*, become hypertonic. So water stays in them. At the day progresses, guard cells make glucose *i.e.*, become hypertonic. So water stays in them. At the end of the day, potassium ions flow back from guard cells to epidermal cells and the concentration of glucose also falls. Due to it, water moves to epidermal cells and guard cells loose turgor. It causes the closure of stoma.